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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,560	11/05/2001	Kenneth E. Gonsalves	46872-257422	5242

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EXAMINER	
LEE, SIN J	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 06/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/992,560	GONSALVES, KENNETH E.	
	Examiner	Art Unit	
	Sin J. Lee	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-60 and 62-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29,38-59 and 65-71* is/are allowed.

6)☒ Claim(s) *1-5,8-10,12,13,22-28,30-37,60,63,64,72,73 and 79* is/are rejected.

7)☒ Claim(s) *6,7,11,14-21,62,74-78 and 80-82* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants canceled claim 61.

2. In view of the amendment filed on February 5, 2004, previous rejections on claims 14-21, 30-37, 51-59, 63, 64, and 69-71 under 35 U.S.C. 112, Second Paragraph are hereby withdrawn.

3. In view of the amendment of February 5, 2004, previous rejections on claims 22, 24, 26, and 28 under 35 U.S.C. 102(e) over Hiraoka et al'471 are hereby withdrawn.

4. In view of the amendment of February 5, 2004, previous rejections on claims 22 and 25-27 under 35 U.S.C. 102(e) over Sellinger et al'958 are hereby withdrawn.

5. In view of the amendment of February 5, 2004, previous rejections on claims 60 and 63 under 35 U.S.C. 102(b) over Barzynski et al'137 are hereby withdrawn.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Claim Rejections - 35 USC § 112

7. Claim 79 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 79 recites the limitation "wherein *the* polyhedral oligosilsesquioxane comprises . . ." in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 22-28 and 30-37 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support for the subject matter of present claim 22 (as amended) in the original disclosure.

Claim Rejections - 35 USC § 102

10. Claims 1-5, 8-10 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kita et al (JP 2000-334881 and its English abstract provided by JPO) (with Chacko which is cited here to support the Examiner's assertion that polyhedral oligomeric silsesquioxanes typically have a size range of 0.7-50 nm).

Kita teaches a mixture of a cage-shaped silsesquioxane and an organic polymer (see the English abstract), and seven different kinds of cage-shaped silsesquioxanes are listed on pg.2-3 of the Japanese document (in those seven formulas, R represents a H atom, an alkyl group, or an aryl group according to PTO's on-site oral translation). Since there are only seven to choose from, one of ordinary skill in the art would immediately envisage a mixture of the cage-shaped silsesquioxane of the formula (1) and an organic polymer. The cage-shaped silsesquioxane of the formula (1) is the present polyhedral oligosilsesquioxane of the formula $Si_8O_{12}R_8$ (wherein R represents an alkyl or an aryl group). Also, according to PTO's on-site oral translation of [0057], examples for the organic polymer includes polysilanes. Therefore, the prior art teaches present inventions of claims 1-4 and 8-10; since the prior art teaches present nanoparticle component of claims 1, 2, 8-10 and present polymer component of claims 1, 3, and 4, it is the Examiner's position that Kita's mixture of the cage-shaped silsesquioxane of the formula (1) and the polysilane would *inherently* be photoimageable as presently recited in claim 1.

Also, since the prior art teaches present nanocomposite resist of claim 1, it is the Examiner's position that the prior art's mixture would inherently have the present glass transition temperature range of claim 13.

With respect to present claim 5, polyhedral oligomeric silsesquioxane molecules typically have an approximate size range of 0.7 to 50 nm as evidenced by Chacko, [0021]. Therefore, Kita teaches present invention of claim 5.

11. Claims 60, 63, and 64 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoai et al (5,945,250).

In Example 1 (see Table 3 in col.93), Aoai teaches a photosensitive composition containing a sulfonium salt resin (I-7) as a photoacid generating compound and a resin (p-hydroxystyrene/p-(1-ethoxyethoxy)styrene copolymer). The sulfonium salt resin is made from the monomer structure (V-5) (see Table 1 in col.24) which chemical structure is shown in col.11, lines 40-55. In Example 1, Aoai applies his resist solution onto a silicon wafer, and the dried resist film is exposed to 248 nm KrF excimer laser and then developed to obtain a resist pattern. Therefore, Aoai teaches present inventions of claims 60 and 63. With respect to present claim 64, Aoai states (col.1, lines 5-10) that his photosensitive composition is useful in the production of semiconductors, for example, integrated circuits. Therefore, one of ordinary skill in the art would immediately envisage making integrated circuit using Aoai's photosensitive composition. Therefore, the prior art teaches present invention of claim 64.

12. Claims 72 and 73 are rejected under 35 U.S.C. 102(e) as being anticipated by Seino et al (6,696,148 B1).

In Example 1 (col.9), Seino teaches a resin composition containing silica particulate (having a particle size ranging from 10-20 nm) (present nanoparticle component of claim 72 comprising an oxide other than a polyhedral oligosilsesquioxane) and polymethyl methacrylate resin (present polymer component of claim 73). Therefore, the prior art teaches present inventions of claims 72 and 73.

Claim Rejections - 35 USC § 103

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al (JP 2000-334881 and its English abstract provided by JPO).

Kita is discussed above in Paragraph 10. Although the English abstract does not teach the amount of the cage-shaped silsesquioxane to be mixed with the organic polymer, Kita is adding the cage-shaped silsesquioxane in order to obtain a film low in refractive index and dielectric constant. Therefore, the present range for the amount of the nanoparticle component would have been obvious to one of ordinary skill in the art, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

14. Claims 6, 7, 11, 14-21, 74-78, 80-82, and 62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Kita et al (JP'881) do not teaches present ranges of claims 6 and 7 for the average diameter of the nanoparticle, and Kita also does not teach or suggest present polymer component of claim 11. Kita does not teach present lithographic process of claim 14. Aoai et al'250 do not teach or suggest present photoacid generating component of claim 62.

15. Claims 29, 38-59, and 65-71 are allowed. Hiraoka'471 nor Sellinger'958 teaches or suggests present polymeric resist of claim 29. Although Barzynski'137 teaches a polymer which comprises a photoacid generating component, the polymer does not include the presently required methacrylate component of claim 38. None of the cited

prior arts teaches or suggests the present polymeric resist of claim 49. None of the cited prior arts teaches or suggests the present polymeric resist of claim 65.

Response to Arguments

16. Applicants argue that Kita discloses a film that appears to be stable to radiation, rather than a film that is photoimageable. The Examiner disagrees. As addressed above, since the prior art teaches present nanoparticle component of claims 1, 2, 8-10 and present polymer component of claims 1, 3, and 4, it is the Examiner's position that Kita's mixture of the cage-shaped silsesquioxane of the formula (1) and the polysilane would *inherently* be photoimageable as presently recited in claim 1.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff, can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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